

WHAT IS CLAIMED IS:

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10 1. An integrated system for providing a plurality of communications network management services and products to a customer over the public internet, said network management services and products accessible from a client workstation employing a client browser associated with said customer and capable of receiving web based communications from a communications service enterprise, said system comprising:

15 (a) one or more secure web servers for managing one or more secure client sessions over the internet in response to customer entry into said system, each said secure web server supporting secure communications with said client workstation;

20 (b) a plurality of client applications integrated within a web-based GUI and downloaded from a secure web server according to pre-determined customer entitlements, each said client application for providing a customer interface integrated within said web based GUI and enabling interactive communications with one or more communications network management

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1 3. The integrated system as claimed in Claim 2,
2 further comprising a dispatch server for communicating
3 with a secure web server and a plurality of said remote
4 application resource, said dispatch server providing
5 verification of system access and proxy generation for
6 said system resources after said customer's
7 entitlements have been verified.

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1 4. The integrated system as claimed in claim 2,
2 wherein said system includes digital certificates to
3 authenticate a secure web server to said client web
4 browser.

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1 5. The integrated system as claimed in Claim 2,
2 wherein said downloaded web-based GUI comprises a
3 backplane object downloaded with, and launched by said
4 web-based GUI, said backplane object capable of
5 launching said one or more client applications upon

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1 *sub E' 7 17* 15. The integrated system as claimed in claim *15*,
2 wherein the client application is a program launched
3 from a new browser window created by the backplane.

1 10. The integrated system as claimed in claim 7,
2 wherein the backplane object maintains session
3 information received from a network management resource
4 in static memory for the duration of a session, and
5 enables the client applications to access the static
6 memory,
7 whereby a need for each of the client applications
8 to communicate with remote network management resources
9 for once obtained information is eliminated.

1 *sub E' 7 18* 18. The integrated system as claimed in claim *15*,
2 further comprising a set of common graphical user
3 interface objects for enabling the client applications
4 and the backplane to provide common look-and-feel
5 desktop window management features.

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18. The integrated system as claimed in claim 17, wherein the inbox client application further includes a polling thread for detecting an incoming message from the inbox server via a first secure connection, the polling thread further starting a new thread upon detection of the incoming message, wherein the new thread starts and listens on a second secure connection for detecting new messages, while the polling thread receives the incoming message on a first secure connection,

whereby multiple messages may be downloaded simultaneously as detected.

19. The integrated system as claimed in claim 18, wherein the database for storing and maintaining said customer specific reporting data further comprises a pre-defined directory associated with each of the one or more network management resources, wherein each of the one or more network management resources stores the

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1 Sub E1 7
2 report data and the notification alert data to its
2 respective pre-defined directory in the inbox server.

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2 20. The integrated system as claimed in Claim 16,
3 wherein a network management resource provides a priced
4 call detail data reporting function for providing
5 customer specific data pertaining to usage of a
customer's switched communications network.

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2 21. The integrated system as claimed in Claim 20,
3 wherein a network management resource providing a
4 priced call detail data reporting function comprises:

5 a system for extracting call detail data records
6 from billing systems generating priced call detail
7 records specific to a customer's communications
network,

8 a system for harvesting said extracted priced call
9 detail records for storage in an database storage
10 device; and

11 a decision support server for receiving customer
12 request messages for said priced call detail data, said

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13 decision support server accessing said customer-
 14 specific priced call detail data from said database
 15 storage device and transmitting said customer-specific
 16 priced call detail data to said inbox server in
 17 accordance with said customer request.

1 *Sub E17* 22. The integrated system as claimed in Claim ²⁹ 21,
 2 wherein a reporting option includes running a pre-
 3 defined report at a pre-determined frequency, said
 4 report scheduler system communicating a message to said
 5 decision support server to run said pre-defined report
 6 at said pre-determined frequency, each said pre-defined
 7 report being updated with recent customer-specific
 8 priced call detail data available at a run time.

1 *Sub a6)* 23. The integrated system as claimed in Claim 16,
 2 wherein a network management resource provides a near
 3 real-time unpriced call detail data reporting function
 4 for providing customer specific data pertaining to
 5 usage of a customer's switched communications network,
 6 said unpriced call detail data reporting service

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7 receiving customer request messages for customer-
 8 specific unpriced call detail data and transmitting
 9 said customer-specific unpriced call detail data to
 10 said inbox server in accordance with said customer
 11 request.

1 24. The integrated system as claimed in Claim ³¹23,
 2 wherein a reporting option includes running a customer-
 3 defined unpriced call detail data report at a pre-
 4 determined frequency, said report scheduler system
 5 communicating a message to an unpriced call detail data
 6 reporting server for obtaining recent customer-specific
 7 unpriced call detail data.

1 25. The integrated system as claimed in Claim 23,
 2 wherein a network management resource comprises:
 3 a system for generating statistical data based on real-
 4 time call data obtained from a circuit-switched
 5 communications network, said statistical data being
 6 generated according to said customer entitlements; and,
 7 a client application for integrating retrieved

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8 statistical data within a Web-based GUI for
 9 presentation to said customer via said integrated
 10 interface, said Web-based GUI being updated to contain
 11 statistical data at customer-specified time intervals.

1 SubE1 7 34
 2 26. The integrated system as claimed in Claim 33,
 3 wherein said customer entitlement includes
 4 specification of one or more toll free numbers
 5 associated with a customer's communications network for
 which statistical data are to be generated.

1 35
 2 27. The integrated system as claimed in Claim 31,
 3 wherein said system for generating statistical data
 4 includes script mechanism for initiating update of said
 web-based GUI with most recent statistical data.

1 28. The integrated system as claimed in Claim 25,
 2 wherein a network management resource comprises:
 3 a communications network configuration device for
 4 maintaining an inventory of customer's network call

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11 customer's network according to said request.

1 *Sub E* 30. The integrated system as claimed in Claim ³⁷~~29~~,
2 wherein said modification request messages includes a
3 unique customer identifier enabling downloading of
4 specific call routing plan details associated with said
5 customer identifier.

1 31. The integrated system as claimed in Claim 30,
2 wherein a customer request message includes an order
3 for modifying an existing customer network call routing
4 plan for a predetermined period of time, said network
5 management server enabling said customer network to
6 automatically revert to a corresponding call routing
7 plan configured prior to invocation of said order at a
8 customer-specified revert time.

1 32. The integrated system as claimed in Claim 31,
2 wherein a customer request message includes an order
3 for modifying a percent allocation of call traffic

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The integrated system as claimed in Claim 34, wherein said report viewer application enables display of broadband network reports in accordance with selected customer reporting options, said customer reporting options including specification of graphical, tabular, and map views of said network performance data.

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The integrated system as claimed in Claim 35, wherein said report viewer application includes support for simultaneous multiple graph reporting views of specific broadband network performance data.

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The integrated system as claimed in Claim 36, wherein said customer's switched data network generates alarm status indications, said broadband network server receiving said alarm status indications pertaining to said customer's network and communicating alarm status data to said customer workstation via said

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⁷ Sub E' 7 integrated interface.

1 ⁴⁴ ~~36~~ ⁴⁵ ~~37~~. The integrated system as claimed in Claim
 2 ~~36~~, wherein said report requestor application enables
 3 generation of messages specifying network performance
 4 thresholds for enabling reporting of specific data
 5 network behavior via said integrated interface.

1 ⁴⁵ ~~37~~ ⁴⁶ ~~38~~. The integrated system as claimed in Claim
 2 ~~37~~, wherein said report viewer supports display of a
 3 graphical view comprising an area map view having
 4 indicators depicting locations of a customer's data
 5 network, said report viewer application enabling said
 6 customer to select said indicators on said graphical
 7 representation and provide a textual view of network
 8 performance characteristics relating to physical
 9 circuits supported at said selected network location.

1 ⁴⁶ ~~38~~ ⁴⁷ ~~39~~. The integrated system as claimed in Claim
 2 ~~38~~, wherein said physical circuits supported at said

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3 Sub E' 7
4 selected network location includes permanent virtual circuits.

1 40. The integrated system as claimed in Claim
2 33, wherein a network management resource includes a
3 system for providing an alarm management function
4 including a device for deriving performance alarms
5 based on performance statistics collected on the
6 performance of a customer's data network; said
7 integrated system further comprising: an event monitor
8 server for receiving and storing the network
9 performance statistics and the derived alarms from the
10 deriving device, and communicating said network
11 performance statistics and the derived alarms for
12 presentation to said customer via said integrated
13 interface.

1 Sub E' 7 48 49
2 40, wherein said report requestor application further
3 enables customers to define and submit network
4 performance thresholds specifying reporting of specific

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5 network behavior via said integrated interface, said
6 event monitor server enabling filtering of said network
7 alarms and performance statistics according to the
8 customer-defined threshold for presentation to the
9 customer at the client workstation.

1 42. The integrated system as claimed in claim
2 41, wherein a report requestor application further
3 enables customers to define and enter troubleshooting
4 procedures for specific alarms or circuits pertaining
5 to the data network via the integrated interface.

1 43. The integrated system as claimed in claim
2 42, wherein a client application associated with said
3 event monitor server enables customers to acknowledge
4 receipt of a network alarm, via said integrated
5 interface, said event monitor server comprising a
6 process for automatically launching the trouble
7 shooting procedure upon acknowledgment of the alarm
8 associated with the trouble shooting procedure.

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24 formatted in a manner suitable for display via said
25 integrated client interface.

1 45. The integrated system as claimed in Claim
2 44, wherein the database of image files further
3 includes an object database, said invoice application
4 server further comprising:
5 conversion process for imaging documents by
6 defining key information necessary to retrieve
7 documents from the communications application service
8 and compress the documents for storing; and
9 store process for loading the compressed documents
10 into the object database.

1 Sub E 11 12 45. The integrated system as claimed in Claim
2 45, wherein the database of image files further
3 includes an index database, said invoice application
4 server further including index load process for storing
5 index pointers pointing to the compressed documents
6 into the index database.

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1 50. The integrated system as claimed in Claim
2 3, wherein said session management provided by said
3 secure server includes web cookie generation at each
4 instance of client identification to link a session
5 with said client through a plurality of discrete client
6 communications in said session to verify said client to
7 said dispatch server at each transmission in said
8 session.

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2 ⁴⁷ 51. The integrated system as claimed in Claim
3 50, wherein said cookie is generated by a program on a
4 separate server during an entitlements communications,
 after identification and authentication of the client.

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2 ⁵ 52. The integrated system as claimed in Claim
3 51, wherein said client web browser secure socket layer
4 encrypts client identification, authentication and said
 session management cookie during each transmission.

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 ⁵³ 53. The integrated system as claimed in Claim

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2 52, wherein said session cookies provide simultaneous
3 session management for a plurality of system resource
4 platforms.

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1 54. The integrated system as claimed in Claim
2 53, further including RSA encryption for transmission
3 of all customer data between said secure web server and
4 said dispatch server, and SSL encryption for
5 transmission of all customer data between said secure
6 web server and said client web browser.

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1 Sub E1 79
2 55. The integrated system as claimed in Claim
3 54, wherein each client request from said web browser
4 is encrypted with a public key provided by said
5 communications network, and each of said client
6 requests includes an encrypted client cookie for client
authentication.

1 56. The integrated system as claimed in Claim
2 36 28, further comprising:
3 a client application downloaded from the secure

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4 web server for enabling a customer to generate trouble
5 tickets to be processed by a trouble ticket resolution
6 entity; and,

7 a service inquiry application server for receiving
8 requests for a customer's trouble ticket information,
9 translating said requests into commands for retrieving
10 trouble ticket information from said communications
11 network configuration device, and downloading response
12 messages including said requested trouble ticket
13 information to said customer via said integrated
14 interface.

1 36 55 57. The integrated system as claimed in Claim
2 28, further comprising:

3 a client application downloaded from said secure
4 web server for enabling customers to manage and track
5 outbound network management features associated with
6 that customer's communications network; and,

7 an outbound network management server for
8 receiving requests for outbound network management
9 features associated with a customer network including
10 calling party numbers, dialing plans, calling card

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11 number and customer identification code sets, or,
12 combinations thereof, translating said received
13 requests into commands for retrieving said outbound
14 network management feature information from said
15 communications network configuration device, and
16 downloading response messages including said requested
17 outbound network management feature information to said
18 customer via said integrated interface.

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1 58. A method for enabling customer management
2 of their communications network assets via the public
3 Internet, including provision of a plurality of
4 services and products accessible from a client
5 workstation employing a client web browser associated
6 with a customer and capable of receiving web based
7 communications from said communications service
8 enterprise providing said products and services, said
9 method comprising the steps of:
10 (a) enabling interactive communications
11 between said system and said customer over the public
12 Internet with an object oriented protocol invoked from
13 within said client web browser, said protocol

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37 resource receiving said request messages, generating a
38 proxy request corresponding to a request message,
39 providing responses according to said request, and
40 communicating said responses to said secure web server
41 for secure uploading to said customer workstation for
42 display via said integrated interface,
43 whereby customer management of its communications
44 network management assets via the public internet is
45 enabled.

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1 Sub E' 7⁵⁸ 59. The method as claimed in claim 58, wherein a
2 secure web server supports a secure sockets layer
3 communications protocol, said secure web server
4 supporting secure socket connections for encrypted
5 communication between said client web browser and said
6 secure web server, said secure server also providing
7 session management including client identification,
8 validation and session management to link said session
9 with said client.

1 sub a16/ 60. The method as claimed in Claim 58, further
2 comprising providing a dispatch server for

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1 applications interoperate with one another to provide
2 said integrated customer interface to a plurality of
3 communications network management products and services
4 subscribed by the customer.

1 ⁶⁴
2 ⁶³ 63. The method as claimed in claim ⁶³ 62, wherein
3 a network management resource comprises a server for
4 providing a customer authentication function, said
5 method comprising:
6 downloading a logon object to be launched by said
7 web-based GUI;
8 accepting logon transactions from the customer and
9 creating a session object for communicating with said
10 authentication server to provide said customer
11 authentication; and,
12 upon successful customer validation, sending a
13 command to the authentication server to download said
14 one or more client applications and said web-based GUI
having the backplane object.

1 ⁶⁴ 64. The method as claimed in claim 63, further

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12 generate a completed report for presentation to said
13 customer via said integrated interface.

1 Sub E' 71 70. The method as claimed in claim 69, wherein
2 said report requestor application enables customization
3 of reporting items to be included in said customer
4 report, said authentication server providing said
5 reporting items capable of being customized according
6 to said customer entitlements to said report requestor
7 application when generating a report request message.

1 72. The method as claimed in claim 70, further
2 including: providing a report scheduler system for
3 initiating periodic generation of reports from network
4 management resources at a customer-specified frequency.

1 72. The method as claimed in claim 71, wherein a
2 network management resource includes a database for
3 storing and maintaining customer specific report data
4 to be reported to said customer, and, a centralized
5 inbox server for receiving a report availability

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1 response from said report management server including a
2 metadata description for displaying said report, said
3 method comprising:

4 uploading said stored customer specific report
5 data and the metadata description associated with the
6 report data from said inbox server to said client
7 workstation via a secure web server for generation and
8 presentation of a customer report via said integrated
9 interface.

1 *Sub E1* 73. The method as claimed in claim ⁷³72, wherein
2 said inbox server stores a notification alert received
3 from a network management resource that a generated
4 report is available, said method including:

5 launching an inbox client application from the
6 backplane for receiving and presenting the notification
7 alert to the customer via said integrated interface.

1 *Sub A(9)* 74. The method as claimed in claim 73, further
2 comprising:

3 implementing a polling thread in said inbox client

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1 application for detecting an incoming message from the
 2 inbox server via a first secure connection;
 3 starting a new thread upon detection of the
 4 incoming message, wherein the new thread starts and
 5 listens on a second secure connection for detecting new
 6 messages, while the polling thread receives the
 7 incoming message on a first secure connection,
 8 whereby multiple messages may be downloaded
 9 simultaneously as detected.

1 *Sub E* ⁷⁶ 25. The method as claimed in claim ⁷⁵ 24, further
 2 including:
 3 defining a pre-defined directory in said inbox
 4 server and customer specific reporting data storage
 5 database, a pre-defined directory being associated with
 6 each of the one or more network management resources,
 7 each of the network management resources storing
 8 reporting data and the notification alert data to its
 9 respective pre-defined directory in the inbox server.

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1 76. The method as claimed in Claim 74, wherein a
2 network management resource provides a priced call
3 detail data reporting process for providing customer
4 specific data pertaining to usage of a customer's
5 switched communications network, said priced call
6 detail data reporting process comprising the steps of:
7 extracting call detail data records from billing
8 systems generating priced call detail records specific
9 to a customer's communications network,
10 harvesting said extracted priced call detail
11 records for storage in a database storage device; and
12 implementing decision support server for receiving
13 customer request messages for said priced call detail
14 data, accessing said customer-specific priced call
15 detail data from said database storage device, and
16 transmitting said customer-specific priced call detail
17 data to said inbox server in accordance with said
18 customer request.

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1 77. The method as claimed in Claim 76, further

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2 comprising:
3 running a pre-defined report at a pre-determined
4 frequency, said report scheduler system communicating a
5 message to said decision support server to run said
6 pre-defined report at said pre-determined frequency,
7 each said pre-defined report being updated with recent
8 customer-specific priced call detail data available at
9 a run time.

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1 78. The method as claimed in Claim 74, wherein a
2 network management resource provides a near real-time
3 unpriced call detail data reporting function for
4 providing customer-specific unpriced call detail data
5 pertaining to usage of a customer's switched
6 communications network, said method comprising:
7 providing an unpriced call detail data reporting
8 server for receiving customer request messages for
9 their unpriced call detail data;
10 obtaining said customer specific unpriced call
11 detail data; and,
12 transmitting said customer-specific unpriced call
13 detail data to said inbox server in accordance with

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14 said customer request.

1 *Sub E1* ⁸⁰79. The method as claimed in Claim ⁷⁹78, wherein a
2 reporting option includes running a customer-defined
3 unpriced call detail data report at a pre-determined
4 frequency, said report scheduler system communicating a
5 message to said unpriced call detail data reporting
6 server for obtaining recent customer-specific unpriced
7 call detail data.

1 *Sub a22* 80. The method as claimed in Claim 78, wherein a
2 network management resource comprises a system for
3 generating statistical data based on real-time call
4 data obtained from a circuit-switched communications
5 network, said statistical data being generated
6 according to said customer entitlements, said method
7 comprising:
8 integrating retrieved statistical data within a
9 Web-based GUI for presentation to said customer via
10 said integrated interface, said Web-based GUI being
11 updated to contain statistical data at customer-

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specified time intervals.

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Sub B' 7 ⁸² 81. The method as claimed in Claim ⁸¹ ~~80~~, further including specifying one or more toll free numbers associated with a customer's communications network for which statistical data are to be generated.

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⁸³ 82. The method as claimed in Claim ⁸¹ ~~80~~, further comprising: implementing a script mechanism for initiating update of said web-based GUI with most recent statistical data.

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suba237 83. The method as claimed in Claim 72, wherein a network management resource comprises a communications network configuration device for maintaining an inventory of customer's network call routing plans and associated call routing plan details, and interfacing with a plurality of network control elements for configuring a customer's communications network according to a desired call routing plan; said method

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9 further comprising:

10 providing a network management server for
11 receiving customer request messages for accessing said
12 call routing plan details from said communications
13 network configuration device;

14 retrieving said call routing plan details
15 according to customer entitlements; and,

16 downloading said call routing plan details for
17 presentation to customers via said integrated
18 interface.

1 *Sub E* ⁹⁴ 84. The method as claimed in Claim ⁹³ 83, further
2 comprising:

3 generating a customer request message specifying
4 customer modification of said call-routing plan, said
5 network management server receiving said request
6 messages via said integrated interface and translating
7 said received modification request into commands for ,
8 input to said network configuration device; and,

9 forwarding said commands to said network control
10 elements for configuring said customer's network
11 according to said request.

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85. The method as claimed in Claim 84, wherein a customer request message includes a unique customer identifier enabling downloading of specific call routing plan details associated with said customer identifier.

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86. The method as claimed in Claim 83, further comprising:

generating a customer request message including an order for modifying an existing customer network call routing plan for a predetermined period of time, said network management server enabling said customer network to automatically revert to a corresponding call routing plan configured prior to invocation of said order at a customer-specified revert time.

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87. The method as claimed in Claim 83, further comprising:

generating a customer request message including an

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4 order for modifying a percent allocation of call
5 traffic routed to a network number used in a particular
6 call routing plan for a predetermined period of time,
7 said network management server enabling said
8 allocation of call traffic routed to a number to
9 automatically revert to a corresponding percent
10 allocation specified prior to invocation of said order
11 at a customer-specified revert time.

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89. The method as claimed in Claim 83, wherein a
network management resource comprises:

3 a customer's switched data circuit network; and,
4 a device for periodically polling network switches
5 of said switched data circuit network to obtain network
6 performance data relating thereto and temporarily
7 storing said network performance data, said method
8 further comprising:

9 providing a broadband network server for receiving
10 customer request messages for reporting network
11 performance data;

12 retrieving said network performance data from
13 temporary storage according to customer entitlements;

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5 connection to the routing engine device; and,
 6 retrieving information relating to the transaction
 7 requests and forwarding back the information to the
 8 client application via the secure server, said client
 9 application presenting the information to the customer
 10 at the client workstation via said integrated
 11 interface.

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 104. The method as claimed in Claim 103,
 further comprising: providing one or more database(s)
 for storing the data statistics generated by the
 routing engine device and the plurality of network
 control elements, said one or more databases operating
 in conjunction with a proxy server for processing
 predetermined transaction requests locally by
 retrieving information related to the transaction
 requests from said one or more database(s), and
 forwarding the information to the client application.

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 105. The method as claimed in Claim 102, further
 including the step of generating a web cookie at each

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3 *Sub E1* instance of client identification to link a session
 4 with said client through a plurality of discrete client
 5 communications in said session to verify said client to
 6 said dispatch server at each transmission in said
 7 session.

1 *sub a27* 105 106. The method as claimed in Claim *104* 105, wherein
 2 said cookie is generated by a program on a separate
 3 server during an entitlements communications, after
 4 identification and authentication of the client.

1 *106* 107. The method as claimed in Claim *105* 106, further
 2 including: encrypting client identification,
 3 authentication and said session management cookie
 4 during each transmission.

1 *Sub E1* 107 108. The method as claimed in Claim *80 85* 107, wherein
 2 said session cookies provide simultaneous session
 3 management for a plurality of system resource
 4 platforms.

1 *sub a28* 108 109. The method as claimed in Claim *107* 109,
 2 further including encrypting transmission of all

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resources provided by said communications service enterprise via a secure web server; and,

(c) each said secure web server supporting communication of request messages entered by said customer via said customer interface to said one or more network management resources capable of providing a desired communications network management function;

wherein said one or more remote application resource processes said request messages and provides responses to said one or more secure web servers for secure uploading to said client browser and display via said integrated customer interface, thereby enabling a customer to manage its communications network assets.

2. The integrated system as claimed in claim 1, wherein said one or more secure web servers supports a secure sockets layer communications protocol including secure socket connections for encrypted communication between said client browser and said secure web server, said secure server also providing session management including customer identification, validation, entitlements and encryption to link said session with said customer.

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1 initiation by said customer, the backplane object
2 further enabling inter-application communications among
3 the client applications and also with said backplane
4 object,

5 whereby said backplane object and the client
6 applications interoperate with one another to provide
7 said integrated customer interface to a plurality of
8 communications network management products and services
9 subscribed by the customer.

1 6. The integrated system as claimed in claim 5,
2 wherein a network management resource comprises a
3 server for providing a customer authentication function
4 and for downloading a logon object to be launched by
5 said web-based GUI, the logon object capable of
6 accepting logon transactions from the customer and
7 creating a session object for communicating with said
8 first server to provide said customer authentication,

9 whereby upon successful customer validation, the
10 logon object sends a command to the authentication
11 server to download said one or more client applications
12 and said web-based GUI having the backplane object.

12. The integrated system as claimed in claim 10,
wherein a network management resource comprises a
server for providing a customer data report management
function comprising and a database for maintaining an
inventory of reports associated with a customer, a said
client application including:

a report requestor application enabling creation
and scheduling of customer specific reports pertaining
to usage of their switched communications networks and
initiating generation of report request messages for
said one or more network management resources via said
integrated interface; and,

a report viewer application enabling display of
reports in accordance with customer-entitled reporting
options.

13. The integrated system as claimed in claim 12,
wherein said report manager server accesses report
items from said database according to a received report
request message, and generates a response message
including a metadata description of reporting items to
be included in said report,

1 whereby customer-specific data from a network
2 management resource and said metadata description of
3 customer-selected reporting items are utilized to
4 generate a completed report for presentation to said
5 customer via said integrated interface.

1 14. The integrated system as claimed in claim 13,
2 wherein said report requestor application enables
3 customization of reporting items to be included in said
4 customer report, said server for providing a customer
5 authentication function providing said reporting items
6 capable of being customized according to said customer
7 entitlements to said report requestor application when
8 generating a report request message.

1 15. The integrated system as claimed in claim 13,
2 wherein a network management resource further comprises
3 a report scheduler system for initiating periodic
4 generation of reports from other network management
5 resources at a customer-specified frequency.

16. The integrated system as claimed in claim 15, wherein a network management resource includes a database for storing and maintaining customer specific report data to be reported to said customer, and, a centralized inbox server for receiving a report availability response from said report management server including a metadata description for generating said report,

said inbox server uploading said stored customer specific report data and the metadata description associated with the report data to said client workstation via a secure web server for generation and presentation of a customer report via said integrated interface.

17. The integrated system as claimed in claim 16, a said client application comprises an inbox client application launched by the backplane for storing a notification alert received from said inbox server, said inbox client application receiving and presenting the notification alert to the customer via said integrated interface.

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5 routing plans and associated call routing plan details,
6 and interfacing with a plurality of network control
7 elements for configuring a customer's communications
8 network according to a desired call routing plan; and,
9 a network management server for receiving customer
10 request messages for accessing said call routing plan
11 details from said communications network configuration
12 device, retrieving said call routing plan details
13 according to customer entitlements, and downloading
14 said call routing plan details for customers via said
15 integrated interface

1 29. The integrated system as claimed in Claim 28,
2 wherein said report requestor application enables
3 generation of messages specifying customer modification
4 of said call-routing plan, said network management
5 server receiving said messages via said integrated
6 interface and translating said received modification
7 request into commands for input to said network
8 configuration device,
9 whereby said commands are forwarded to said
10 network control elements for configuring said

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4 routed to a network number used in a particular call
5 routing plan for a predetermined period of time, said
6 network management server enabling said
7 allocation of call traffic routed to a number to
8 automatically revert to a corresponding percent
9 allocation specified prior to invocation of said order
10 at a customer-specified revert time.

1 33. The integrated system as claimed in Claim 28,
2 wherein a network management resource comprises:
3 a customer's switched data circuit network; and,
4 a device for periodically polling network switches
5 of said switched data circuit network to obtain network
6 performance data relating thereto and temporarily
7 storing said network performance data; said integrated
8 system further comprising: a broadband network server
9 for receiving customer request messages for reporting
10 network performance data, retrieving said network
11 performance data according to customer entitlements,
12 and downloading said network performance data to said
13 customer for presentation via said integrated
14 interface.

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1 44. The integrated system as claimed in Claim
2 28, wherein a network management resource includes a
3 system for generating invoice documents relating to a
4 communications management services provided by said
5 communications service enterprise; said integrated
6 system further comprising:

7 a client application downloaded from the secure
8 web server for enabling selection and presentation of
9 invoice documents in accordance with customer
10 entitlements, said client application further
11 generating an invoice request message in response to
12 customer selection of a specific invoice option and
13 forwarding the invoice request message via the secure
14 web server; and

15 an invoice application server for maintaining a
16 database of image files associated with invoice
17 documents from the application service and receiving
18 the invoice request message, said invoice application
19 server accessing the database in response to a request
20 message, generating a response message including a
21 customer selected invoice document, and downloading
22 said response message to said client workstation,
23 whereby said customer selected invoice document is

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1 47. The integrated system as claimed in Claim
2 28, wherein a network management resource further
3 comprises a system for providing a circuit switched
4 call center management function, said integrated system
5 further comprising:

6 a client application downloaded from the secure
7 web server for enabling a customer to monitor, define,
8 and manipulate call routing parameters, the client
9 application further formatting customer defined
10 parameters into client message transactions and
11 communicating the client message transactions to the
12 secure server over the secure connection; and,

13 a routing engine device for maintaining call
14 routing rules and interfacing with said plurality of
15 network control elements for directing call routing and
16 receiving data statistics, the routing engine device
17 further using the rules, the data statistics, and the
18 customer defined parameters in determining where to
19 route calls, whereby customer control of call routing
20 via said integrated interface is enabled.

1 48. The integrated system as claimed in Claim

2 47, further comprising a proxy server for processing a
3 plurality of transaction requests received from the
4 client application via the secure server by opening a
5 connection to the routing engine device and retrieving
6 information relating to the transaction requests and
7 forwarding back the information to the client
8 application via the secure server, and wherein the
9 client application presents the information to the
10 customer at the client workstation.

1 49. The integrated system as claimed in Claim
2 48, further comprising one or more database(s) for
3 storing the data statistics generated by the routing
4 engine device and the plurality of network control
5 elements, said one or more databases residing with the
6 proxy server, the proxy server further processing
7 predetermined transaction requests locally by
8 retrieving information related to the transaction
9 requests from said one or more database(s), and
10 forwarding the information to the client application.

14 supporting customer identification, authentication and
15 a determination of network entitlements for the
16 customer;

17 (b) managing a plurality of customer sessions
18 over the public Internet with a secure web server,
19 said secure web server providing session encryption and
20 management of the customer's session, said session
21 management including the steps of identifying,
22 validating, and determining the customer's entitlements
23 within the network;

24 (c) initiating download of a web-based GUI
25 from said secure web server, said downloaded web-based
26 GUI capable of launching one or more of a plurality of
27 client applications available to a customer according
28 to pre-determined customer entitlements,

29 (d) providing a customer interface integrated
30 within said web-based GUI upon launch of a selected
31 client application, said customer interface enabling
32 interactive communication of request messages with one
33 or more of a plurality of communications network
34 management resources capable of providing a selected
35 communications network management function;

36 (e) a communications network management

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1 communicating with a secure web server and each of said
2 plurality of said network management resources, said
3 dispatch server verifying system access and proxy
4 generation for said system resources after said
5 customer's entitlements have been verified.

1 61. The method as claimed in claim 60, further
2 employing digital certificates to authenticate a secure
3 web server to said client web browser.

1 62. The method as claimed in Claim 60, wherein
2 said downloaded web-based GUI comprises a backplane
3 object downloaded with, and launched by said web based
4 GUI, said backplane object launching said client
5 applications programs upon initiation by said customer,
6 the backplane object further enabling inter-application
7 communications among the client applications and also
8 with said backplane object,
9 whereby said backplane object and the client

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2 comprising:

3 providing a customer object for representing a
4 current customer, the customer object communicating
5 with said authentication server to determine the
6 customer's entitlements to the web enabled
7 communications network management services,
8 whereby the backplane uses the entitlements to
9 display via said integrated interface only those web
10 enabled services to which the customer has privilege.

1 65. The method as claimed in claim 64, further
2 including the step of:

3 executing a client application directly by the
4 backplane object when the customer selects a client
5 application associated with a desired communications
6 network management service, the selected client
7 application running in a frame independent from a web
8 browser's window.

1 66. The method as claimed in claim 65, further
2 including the step of:

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3 maintaining session information received from a
4 network management resource in static memory for the
5 duration of a session, and enabling the client
6 applications to access the static memory,
7 whereby a need for each of the client
8 applications to communicate with remote network
9 management resources servers for once obtained
10 information is eliminated.

1 67. The method as claimed in claim 65, wherein
2 said client applications utilizing a set of common
3 graphical user interface objects and the backplane for
4 providing common look-and-feel desktop window
5 management features.

1 68. The method as claimed in claim 66, wherein a
2 network management resource comprises a report manager
3 server for providing a customer data report management
4 function and a database for maintaining an inventory of
5 reports associated with a customer, said method further
6 comprising:

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7 providing a report requestor client application
8 enabling creation and scheduling of customer specific
9 reports pertaining to usage of their switched
10 communications networks and initiating generation of
11 report request messages for said one or more network
12 management resources via said integrated interface;
13 and,

14 providing a report viewer application enabling
15 display of reports in accordance with customer-entitled
16 reporting options.

1 69. The method as claimed in claim 68, further
2 comprising:

3 accessing report items from said database of
4 inventory reports according to a received report
5 request message; and,

6 generating a response message including a metadata
7 description of reporting items to be included in said
8 report,

9 whereby customer-specific data from a network
10 management resource and said metadata description of
11 customer-selected reporting items are utilized to

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14 and,
15 downloading said network performance data to said
16 customer for presentation via said integrated
17 interface.

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89/ 90. The method as claimed in Claim 88, further
comprising:

enabling display of broadband network reports in
accordance with selected customer reporting options,
said customer reporting options including specification
of graphical, tabular, and map views of said network
performance data.

90/ 91. The method as claimed in Claim 89, wherein
said report viewer application includes supporting
simultaneous multiple graph reporting views of specific
broadband network performance data.

91/ 92. The method as claimed in Claim 88, wherein
said customer's switched data network generates alarm

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3 status indications, said broadband network server
4 receiving said alarm status indications pertaining to
5 said customer's network and communicating alarm status
6 data to said customer workstation via said integrated
7 interface.

Rule
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1 93. The method as claimed in Claim 92, further
2 comprising the step of generating customer request
3 messages specifying network performance thresholds for
4 enabling reporting of specific data network behavior
5 via said integrated interface.

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1 94. The method as claimed in Claim 93, wherein
2 said report viewer supports display of a graphical view
3 comprising an area map view having indicators depicting
4 locations of a customer's data network, said method
5 including enabling said customer to select said
6 indicators on said graphical representation and
7 providing a textual view of network performance
8 characteristics relating to physical circuits supported
9 at said selected network location.

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1 The method as claimed in Claim 89, wherein
2 a network management resource includes a system for
3 providing an alarm management function including a
4 device for deriving performance alarms based on
5 performance statistics collected on the performance of
6 a customer's data network; said method further
7 comprising:

8 providing an event monitor server for receiving
9 and storing the network performance statistics and the
10 derived alarms from the deriving device, and
11 communicating said network performance statistics and
12 the derived alarms for presentation to said customer
13 via said integrated interface.

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1 The method as claimed in claim 95, further
2 enabling customers to define and submit network
3 performance thresholds specifying reporting of specific
4 network behavior via said integrated interface, said
5 event monitor server filtering said network alarms and
6 performance statistics according to the customer-

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7 defined threshold for presentation to the customer at
8 the client workstation.

1 ⁹⁶
~~97.~~ The method as claimed in claim ⁹⁵~~96~~, further
2 enabling customers to define and enter troubleshooting
3 procedures for specific alarms or circuits pertaining
4 to the data network via the integrated interface.

1 ⁹⁷
~~98.~~ The method as claimed in claim ⁹⁶~~97~~,
2 providing a client application for enabling customers
3 to acknowledge receipt of a network alarm, via said
4 integrated interface, said event monitor server
5 automatically launching a trouble shooting procedure
6 upon acknowledgment of the alarm associated with the
7 trouble shooting procedure.

1 ⁹⁸
~~99.~~ The method as claimed in Claim ⁹⁹~~12~~, wherein
2 a network management resource includes a system for
3 generating invoice documents relating to
4 communications network management services provided by

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5 said communications service enterprise, said method
6 further comprising:

7 downloading a client application from the secure
8 web server for enabling selection and presentation of
9 invoice documents in accordance with customer
10 entitlements;

11 generating customer request messages including
12 customer selection of a specific invoice option;

13 providing an invoice application server for
14 maintaining a database of image files associated with
15 invoice documents from the application service, said
16 invoice application server: receiving the invoice
17 request message from said customer;

18 accessing the database in response to a request
19 message;

20 generating a response message including a customer
21 selected invoice document;

22 downloading said response message to said client
23 workstation; and,

24 formatting said customer selected invoice document
25 in a manner suitable for display via said integrated
26 client interface.

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1 The method as claimed in Claim ~~99~~,
2 wherein the database of image files further includes an
3 object database, said invoice application server
4 further:

5 converting invoice documents to images;
6 defining key information necessary to retrieve
7 documents from the communications network management
8 resource application service and compressing the
9 documents for storing; and
10 loading the compressed documents into the object
11 database.

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1 ~~101~~. The method as claimed in Claim ~~100~~,
2 wherein the database of image files further includes an
3 index database, said method further including storing
4 index pointers for pointing to the compressed documents
5 in the index database.

101

1 ~~102~~. The method as claimed in Claim ~~101~~, wherein
2 a network management resource further comprises a
3 system for providing a circuit switched call center
4 management function, said method further comprising:

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rt Unit: 2756
r: B. Jaroenchonwanit
No.: COS-97-087

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Inventor: Barry et al.

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Examiner: B. Jaroenchonwanit
Docket No.: COS-97-087

Attached herewith is a copy of the following:

1. Transmittal Form;
2. Status Inquiry
3. Information Disclosure Statement;
4. PTO-1449 Form (5 Page); and
5. 94 References.



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5 downloading a client application from the secure
6 web server for enabling a customer to monitor, define,
7 and manipulate call routing parameters, the client
8 application further formatting customer defined
9 parameters into client message transactions and
10 communicating the client message transactions to the
11 secure server over the secure connection; and,

12 providing a routing engine device for maintaining
13 call routing rules and interfacing with said plurality
14 of network control elements for directing call routing
15 and receiving data statistics, the routing engine
16 device further using the rules, the data statistics,
17 and the customer defined parameters in determining
18 where to route calls, whereby customer control of call
19 routing via said integrated interface is enabled.

102 101
1 103. The method as claimed in Claim 102,
2 further comprising: processing a plurality of
3 transaction requests received from the client
4 application via the secure server by opening a

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3 customer data between said secure web server and said
4 dispatch server using RSA encryption, and encrypting
5 transmission of all customer data between said secure
6 web server and said client web browser using SSL
7 encryption.

110. The method as claimed in Claim 109,
further including encrypting each client request from
said web browser with a public key provided by said
communications network, and each of said client
requests includes an encrypted client cookie for client
authentication.